

**Biological Assessment
For the
Mid-Temperance Environmental Assessment and
Categorical Exclusions**

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Date: May 21, 2007

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Executive Summary

This Biological Assessment (BA) documents the potential effects on federally proposed, candidate, threatened or endangered species and designated critical habitat that could result from proposed vegetation management project and associated activities as documented in the Mid-Temperance Environmental Assessment (USDA 2007), restoration categorical exclusion and fuel reduction categorical exclusion. The BA tiers to the Programmatic Biological Assessment for the revision of the Forest Plan (USDA Forest Service 2004, pp. 6-7) and provides more specific information on site-specific effects of the project to threatened and endangered species.

The findings (determination of effect) of the BA are summarized in Table 1 below.

Table 1. Summary of Determination of Effects						
Species	Alt 1	Alt 2	Alt 3	Restoration CE	Fuels CE	Rationale
Bald eagle	NLAA	NLAA	NLAA	NLAA	NLAA	Little to no change to nesting or foraging habitats expected. No disturbance is expected within ¼ mile of known nest sites with Alt 3 of the EA. White pine will increase as a component of other forest types under the EA action alternatives. The historical nest near the proposed underplanting units in the restoration CE will be protected following the Bald Eagle Recovery Plan. Eagle populations are increasing on the Superior National Forest (MN DNR 2006).
Canada lynx	NLAA	NLAA	NLAA	NLAA	NLAA	The existing road and compacted trail density for LAU 32 is 1.23 miles/mi ² which will not change by alternative. Small changes in the percent of unsuitable habitat are expected. Temporary roads could lead to short-term disturbance but amount to less than 5 miles in any alternative. Habitat connectivity will be maintained. Cumulative effects could contribute but are expected to be minimal because the majority of the LAU is in federal ownership.
NLAA = Not likely to adversely affect LAA = Likely to adversely affect						

1.0 Introduction

This Biological Assessment (BA) documents the potential effects on federally proposed, candidate, threatened or endangered species and designated critical habitat that could result from proposed vegetation management projects and associated activities as documented in the Mid-Temperance Environmental Assessment (USDA 2007).

This BA was prepared in compliance with the requirements of Forest Service Manual Directives sections 2670.31, 2670.5(3), and 2672.4, the Endangered Species Act of 1973 as amended, and the National Forest Management Act of 1976.

Information provided by the USDI Fish and Wildlife Service (USDI FWS April 4th 2007. Letter from Field Supervisor Tony Sullins) confirms the species and critical habitat that should be considered for projects conducted on the Superior National Forest:

- Bald eagle (threatened), with no designated critical habitat
- Canada lynx (threatened), with proposed critical habitat

2.0 Consultation with USDI Fish and Wildlife Service

The Forest Service has initiated consultation with the Fish and Wildlife Service seeking concurrence with the determination of effects in this BA, which concludes that Alternative 3 may affect, but is not likely to adversely affect bald eagle or Canada lynx. No consultation has been requested for Canada lynx critical habitat since there is none in the project area.

The Forest Service has also initiated consultation with the Fish and Wildlife Service seeking concurrence with the determination of effects in this BA, which concludes that the activities proposed in the categorical exclusions, may affect, but are not likely to adversely affect bald eagle or Canada lynx.

In addition to consultation for bald eagle and Canada lynx requested for this project, programmatic consultation was recently undertaken for Forest Plan revision. The history of this consultation is documented in the Programmatic Biological Assessment for the revision of the forest plans (USDA Forest Service 2004, pp. 6-7). The relevance of program-level consultation to this project includes those agreements between the Forest Service and the Fish and Wildlife Service reached on defining elements of species' ecology and biology, risk factors and general effects, analysis parameters, monitoring, and management direction in the revised Forest Plan. The BA provides more specific information on how relevant information in the program-level BA is incorporated. Additionally, other factors relevant to this project not discussed in detail in program-level consultation will be discussed in detail in this BA.

Consultation specific to the Mid-Temperance Project is documented in the project file. It includes emails, telephone calls, and meeting notes between Dec. 4th, 2006 and the submission of the BA to the FWS.

3.0 The Proposed Action

- **Location:** Superior National Forest, Tofte Ranger District, Cook County, Minnesota. (See figure 1-1 on page 1-2 of Mid-Temperance EA for vicinity map).
- **Ecological Setting:**

Table 1.2: Mid-Temperance Project Area Acres by Landscape Ecosystem (LE)*

Landscape Ecosystem	Acres Mid-Temperance in LE	% of Mid-Temperance Acres in LE	Forest-wide LE Acres**	Mid-Temperance Contribution to Forest-wide LE (%)
Mesic Birch-Aspen-Spruce-Fir	23,127	60%	281,300	8%
Lowland Conifer	7,472	19%	205,500	4%
Lowland Black Ash	2,900	8%	16,200	18%
Non-Forested Land	2,905	8%	132,224	2%
Cedar	1,689	4%	31,300	5%
Other LEs***	500	1%	502,000	>1%
TOTAL	38,593			

*Total acres include upland and lowland types within each LE

**Acres taken from the 2004 Superior National Forest Land and Resource Management Plan

***Sugar Maple, Dry Mesic Red and White Pine, Jack Pine-Black Spruce Landscape Ecosystems

- **Overview of species' Affected Environment:**

Eagle	Total #
Lakes >20 ac	7
Fish-bearing Streams	2
Lynx	Percent of Project Area
LAU 32 (small portions of 5 other LAUs in project area)	(97% of LAU 32 is in project area)
Proposed Critical Habitat	0%
<i>Data source: Mid-Temperance resource report August 28th 2006</i>	

- **Other relevant setting features:**

The Mid-Temperance Project Area is located in Cook County, Minnesota, in Townships 59, 60 and 61 North and Ranges 4 and 5 West and is bisected by County Highway 2 (Sawbill Trail). Notable water features in the project area include Fourmile, Richey, and Pancore Lakes, the Temperance River, and numerous creeks including Pancake, Blind Temperance, Honeymoon, and Sixmile (see Figure 1-1: Vicinity Map, Mid-Temperance EA).

The Mid-Temperance Project Area encompasses approximately 41,800 acres of land, of which 38,400 acres are National Forest System land. Approximately 33,500 acres (87%) of NFS land are classified as capable of producing timber.

- **Proposed action summary**

The USDA Forest Service Superior National Forest (SNF) proposes timber, reforestation and fuel reduction management activities in the Mid-Temperance Environmental Assessment. The proposed action and two other alternatives (including no action) are described in Chapter 2 of the Mid-Temperance Project EA (Sect. 2.3). The operational standards and guidelines are listed in Appendix C of the Mid-Temperance EA (USDA 2007). The action alternatives include the following activities in different amounts and locations:

- Timber harvest: Includes even-aged and uneven-aged harvest methods. Actual treatment acres will be less than the stand acres disclosed in the EA due to mitigations for soils, visuals, wildlife and other resources.
- Reforestation: Includes site prep, interplanting and seeding.
- Road management: Includes only temporary (temp) road construction

Other reasonably foreseeable federal actions were proposed in our scoping document (USDA 2006) and will be covered under two categorical exclusions:

- The first categorical exclusion will cover non-fuel restoration activities including 508 acres of mechanical site preparation followed by planting and 123 acres of white pine underplanting along Four Mile Lake.
- A second categorical exclusion will cover fuel reduction activities including 201 acres of understory mechanical fuels reduction, 85 acres of under burning, and 21 acres of hand pile and burning, all primarily in red pine plantations.

A complete list of cumulative effects actions considered is listed in Appendix E of the Mid-Temperance EA.

- **Purpose of the action:**

The purpose of the action is to implement the Forest Plan and is described in the Mid-Temperance EA, section 1.3 and 1.4.

- **Time frame of the action:**

All of the management activities are expected to be implemented during the next ten years beginning in 2007. Some activities may be started by the end of 2007 and may be completed before other projects would be started. The harvest activities would occur throughout all seasons. Some units have specific harvest times such as winter or summer because of mitigations. Season of harvest is identified for each harvest unit and is listed on the unit card. The reforestation activities would not occur until after completion of the harvest. The year 2014 marks the first decade of the Forest Plan and is used as our benchmark to measure cumulative changes to management indicator habitats.

- **Project activities analyzed in program-level BA**

Proposed actions	Alt. 1 – No Action	Alt. 2	Alt. 3	Restoration CE	Fuel Reduction CE	Addressed in Program-level BA?
Timber Harvest	NA	x	x	NA	NA	Y
Reforestation	NA	x	x	x	NA	Y
Temporary roads	NA	x	x	NA	NA	Y
Hazardous fuel reduction	NA	NA	NA	NA	x	Y

4.0 Status of the Species

4.1. Bald Eagle

Ecology (see section 2.3 of program-level BA)

- Terrestrial Habitat: No new information
- Aquatic Habitat: No new information
- Diet: No new information

Population Status (see section 2.4 of program-level BA)

- Breeding population/trend in United States: No new information
- Breeding population/trend in Minnesota: Statewide there appears to be a 28% increase in active nests from the 2000 survey (MN DNR 2006)
- Breeding population/trend in the National Forest: On the Superior National Forest the 2005 survey shows a 15.4% increase in active nests from 2000 (MN DNR 2006)
- Wintering population/trend (United States, Minnesota, National Forest): No new information

Population Status in Project Area:

- Project site-specific surveys: We last checked historical nest sites on Fourmile Lake in April 2007
- Known occurrences: There are two historical nest sites within the midlevel area on Fourmile Lake. The first Fourmile Lake nest discovered has not been active since 1998. The other Fourmile nest site has been active for the last four years. There are also two historical osprey nests on Richey Lake but we have not observed eagles using either nest.
- Potential habitat: There are 7 lakes within the project area that provide suitable foraging habitat (fish-bearing waters greater than 20 acres) including Pancore, Soda, Fourmile, Waffle, Cedar, Richey, and Dogwood lake. The Temperance River and Cross River may also provide some foraging habitat. Approximately 2,000 acres of red pine and 25 acres of white pine forest type occur in the midlevel area. There are no mature (100+ years old) red and white pine stands in the midlevel area so few suitable nest trees may exist. Scattered larger trees are likely to occur but the number and location is unknown.

Factors Affecting Eagle Environment (see section 2.5 of program-level BA)

- Terrestrial habitat (habitat loss, forest management, etc): No new information
- Aquatic habitat (changes in aquatic prey base, etc): No new information
- Human Disturbance (forest management, roads, recreation activities, trauma, etc): No new information
- Other factors: No new information

4.2 Gray Wolf

As a result of the increasing Minnesota population and the development of viable populations in neighboring states, the U.S. Fish and Wildlife Service recently removed Endangered Species Act protection for the Gray Wolf Western Great Lakes Distinct Population Segment. The final rule to delist this Distinct Population Segment was published in the Federal Register on February 8, 2007 and took effect on March 12, 2007 (http://www.fws.gov/midwest/wolf/2007delisting/2007delist_fs.pdf). The wolves in the Mid-Temperance project area are a part of the Western Great Lakes Distinct Population Segment. Management objectives for gray wolves on the Superior National Forest have changed from seeking to recover the species to seeking to maintain, protect and enhance its habitat and prevent federal listing. The Forest Service will continue to consider project effects to gray wolves in our analysis of Forest Service Sensitive Species.

4.3 Canada Lynx:

Ecology (see section 4.3 of program-level BA)

- Home range and dispersal: No new information
- Diet: No new information
- Den site selection: No new information
- Mortality: The programmatic Biological Assessment (USDA FS 2004b) identified paved roads as one of several factors contributing lynx mortality across its range. At that time, most documented lynx road mortality was in relocated animals suggesting that introduced animals may be more vulnerable to highway mortality than resident lynx (Brocke et al 1990 in USDA FS 2004b). Since the writing of the programmatic BA more information has become available on lynx road mortality. It is evident by the data that follows, paved and gravel roads are both factors that contribute to resident lynx mortality.

In Minnesota, since 2001, 6 lynx are known to have been killed on roads (USDA FS 2006c):

- 3 were on paved highways (speed limits 46-60+ mph)
- 2 were on secondary roads (speed limits?-60 mph)
- 1 was on a gravel Forest Service Road (OML 3) (speed limits 26-45 mph)

In Maine, since 2000, all lynx road mortality (6 animals) documented has occurred on (gravel) logging roads. Most mortality occurred on two-lane haul roads where higher traffic volume and speed would occur. These roads are open to the public, and public traffic volume exceeds logging traffic by several folds (McCollough in Delphey 2006).

Trapping, hunting, and other potential sources of human caused mortality are indirectly influenced by roads and are address in the programmatic BA. Since 2002, 3 lynx are known to have been shot and 13 lynx known to have been trapped in Minnesota. Of the trapped lynx 8 were released alive (USDA FS 2006c).

- Interspecific relationships with other carnivores: No new information
- Population dynamics: No new information

Population Status (see section 4.4 of program-level BA)

- North America: No new information
- Minnesota: According to the MN DNR as of July 6, 2006 (Lynx sighting website accessed November 14, 2006):
 - 426 reports with location information have been received to date
 - 63 (13%) reports have been verified as lynx
 - 35 (9%) reports are assumed to provide evidence of reproduction
- Superior National Forest: NRRI has captured and collared 33 lynx on the Superior NF. Radio collared females had 10 kittens in 2004 and 12 kittens in 2005. Of the 2004 kittens at least 1 survived to the end of 2005. Of the 32 lynx radio collared by December 31, 2005 2 died in 2003 and 14 deaths were recorded between 2004 and 2005 (Moen et. al. 2005 and 2006). No updated information is available on lynx confirmed through genetic sampling.
- Minnesota's lynx-hare cycles: The 2004 grouse and hare census states that while we remain near a peak, a cyclic decline in hare numbers may be starting, or can be expected soon (Erb 2004a). Based on known cyclic patterns, snowshoe hare indices have been expected to decline. Following a 'prolonged' peak, hare winter track indices declined for the first time in 6 years (Erb 2004b). It appears that MN DNR stopped tracking snowshoe hare indices after 2004.

Population Status in Project Area:

- Project site-specific surveys: We completed a snow-tracking survey in Feb. 2006 but did not locate any lynx tracks. District personnel have followed lynx tracks, collected scat and attempted to live-trap lynx along the Sawbill Trail. The NRRI lynx study covers many areas of the national forest including the Mid-Temperance project area.
- Known occurrences: We have been gathering information on lynx within the project area for the past several years and have verified their presence. Lynx are expected to be reproducing in the project area but we know of no den sites or reports of kittens. We know of one occurrence of a wide-ranging male lynx in the project area that was recorded during an aerial survey by NRRI (Burdett 2006).

Factors Affecting Lynx Environment (see section 4.5 of program-level BA)

- Roads and trails: No new information.

- Winter dispersed recreation: No new information.
- Trapping and shooting: A lawsuit was recently filed by the Animal Protection Institute (API) against the Minnesota Department of Natural Resources citing that actions must be taken to protect threatened and endangered species (including lynx) from illegal trapping (See previous section on mortality for specific data on trapping and shooting mortality in Minnesota).
- Vehicle collisions: No new information.
- Other factors: The most critical period for denning Canada lynx is late April through July.

5.0 Affected Environment and Environmental Consequences

5.1 EAGLE:

A. Analysis Area:

- **Direct/Indirect Effects Analysis Area:** *Habitat indicators:* Analysis area for Forest Plan Programmatic BA Indicators is the project area. Analysis area for additional project level habitat indicators is 1/2 mile from known nests within the project area.
Human Disturbance indicators: Analysis area for Forest Plan Programmatic BA indicators is the project area. Analysis area for direct effects of disturbance factors is 1/4 mile from known nests.
- **Cumulative Effects Analysis Area:**
Cumulative effects analysis area is the project area and 1/2 mile buffer around Fourmile Lake. Past actions are taken into account in the existing condition. Present and foreseeable future (10 yrs) actions are considered. See Appendix E for Mid-Temperance Area Forest Management Project Past, Present, and Reasonably Foreseeable Future Projects considered in the Cumulative Effects analysis for this species (USDA 2007).
- **Analysis timeframe:**
 - *Existing condition:* 2007
 - *Direct/indirect and Cumulative effects:* 2016

Rationale for Analysis Area and Time Frame: The effects of the Mid-Temperance management proposals are not expected to extend beyond the project area. On the SNF, most bald eagle nests are within 1/2 mile of fish bearing lakes greater than 20 acres and streams so this analysis area is appropriate to analyze indirect effects at a site specific scale. The 1/4 mile from known nests analysis area is identified in the Northern States Bald Eagle Recovery Plan as an appropriate scale to consider direct effects of disturbance to nesting eagles.

The programmatic BA has done a complete job of considering cumulative effects to eagle habitat across a broad landscape, to which effects to eagle habitat are similar at the project scale. The appropriate scale for cumulative effects is the project scale where site-specific impacts from human disturbance are best measured. Human access effects of this project will not go beyond the project area scale, therefore cumulative effects should be measured at this scale.

A reasonably foreseeable future timeframe of ten years is appropriate because it includes all known future projects and provides a reasonably reliable estimate of what is expected to happen. The year 2014 marks the first decade of the Forest Plan and is used as our benchmark to measure cumulative changes to management indicator habitats.

B. Effects Analysis –Bald Eagle:

Identify and analyze the direct and indirect effects of the action and the cumulative effects of other actions in the project area

Bald Eagle Indicators

Forest Plan BA Indicator	Use?	Rationale for exclusion
1. Red and White pine type 0-9 yrs old	N	30 acres of pine interplanting in the EA will be discussed under the determination of effects. No changes in red or white pine type are proposed. See Indicator 6.
2a. Acres of RW pine forest	N	Acres of mature red and white pine type will not vary with management proposals. There are only 48 acres of treatment proposed in red pine stands in the EA.
2b. Acres of RW pine forest 100 yrs old	N	Acres of mature red and white pine type will not vary with management proposals.
3. Miles of ATV trails	N	Currently there are no designated ATV trails in the project area. This will not change with any alternative.
4. Miles of snowmobile trails	N	Snowmobile trails will not vary by alternative
5. Miles of temp roads	Y	
Other Indicators		Rational for inclusion
6. Acres of underplanting of white pine to increase within stand diversity within ½ mile of fish bearing waters	Y	To indicate habitat improvement activities which include increasing white pine as a component of other forest stands

Existing Conditions and Effects

Bald Eagle Indicators ¹	Existing Condition	Alt 1 No Action	Alt 2 Proposed	Alt 3
5. Miles of temp roads	0	0	3.2	4.3
¹ No Temporary roads proposed in restoration CE or fuels reduction CE Data source: MTEA road Alt2.shp, MTEA road Alt3.shp, 04/02/2007, ArcGIS				

Other Bald Eagle Indicators ¹	Existing Condition	Restoration CE ²	Fuel Reduction CE
6. Acres of underplanting of white pine to increase within stand diversity within ½ mile of fish bearing waters	0	123	0
¹ Does not include ¼ acre of white pine planting along Temperance River ² Represents stand acres. Treatment acres will be less and dependent on local site conditions.			

Cumulative Effects (ESA and NEPA)

The FEIS for the Forest Plan states that “additional impact to bald eagle would occur on lands outside of the National Forest jurisdiction. Specifically, cumulative effects related to habitat conditions such as red and white pine forest and human disturbances could occur.”(USFS 2004b pg 3.3.4-16). Past land management activities on all ownerships have shaped the habitat that exists today for bald eagle in the project area. Appendix E of the Mid-Temperance EA summarizes past, present and expected future management actions that might contribute to cumulative effects (USDA 2007).

Timber harvesting of red and white pine can affect the availability of trees to eagles for nesting and perching. Past federal actions include thinning activities in pine stands (see Appendix E, USDA 2007). Little impact to eagle foraging or nesting habitats is expected as a result of thinning operations. Thinning generally removes subdominant trees that are not preferred for nesting or perching. Future federal activities include 123 acres of white pine underplanting to improve eagle habitat conditions near Fourmile Lake (See Indicator 6). Minimal cumulative effects are expected as a result of timber harvesting on State and Private land. Nonfederal lands make up a small percentage of the project area (9%) and are dominated by non-pine forest types. The private parcel of land on the north end of Fourmile Lake could contain potential nest trees that might be harvested. Our proposal to plant white pine near this lake would mitigate these impacts over time.

Insignificant or discountable effects are expected from all other activities listed in Appendix E or within ½ mile of Fourmile Lake. Using fire for restoration or fuel reduction may kill a few mature pine trees but can also create suitable conditions for pine regeneration and/or suitable perch or nest trees. There are no fuel reduction activities within ½ mile of suitable lakes. These activities primarily target young

balsam and retain young pine wherever possible. Restoration activities such as mechanical site prep will generally leave overstory trees standing and favor tree regeneration. Road construction on nonfederal land has the potential to disturb nesting eagles. However, there are no direct/indirect effects from federal road construction expected near Fourmile with the Mid-Temperance EA, therefore, no cumulative effects would occur. Residential development around Pancore Lake may reduce habitat quality for eagles but it is unlikely that this lake provides much foraging opportunity due to its small size. Overall, minimal cumulative effects would occur from the activities listed in Appendix E. Eagle populations are rising and cumulative impacts associated with this project are not expected to reverse this trend.

C. Consistency with Forest Plan – Bald Eagle:

Forest Plan Guidance	Direction	Alts and CEs In Compliance	Basis for Compliance	Remarks
O-WL-4	Maintain or improve habitat	EA Alts 1-3 CE – restoration CE - fuels	Project-wide acres of MIH7. Habitat within ¼ mile of historical nest sites.	Habitat will be maintained. The pine underplanting proposed under the restoration categorical exclusion could improve nesting habitat near Fourmile Lake.
O-WL-5	Seek opportunities to benefit TE spp.	2-3 CE – restoration	30 acres of pine interplanting in the EA action alternatives.	We are proposing 123 acres of white pine underplanting near Fourmile Lake to provide future nesting habitat for eagles. These treatments are covered under the restoration CE.
O-WL-6	Reduce or eliminate adverse effects to TE	EA 1-3 CE – restoration CE - fuels	Mitigations and Operational Standards and Guidelines	Nesting eagles will be protected from disturbance and potential nest/roost trees will not be cut.
O-WL-7	Minimize building or upgrading roads in TE areas	EA Alts 1-3 CE – restoration CE - fuels	Disturbance Indicator #5	There are no proposals to upgrade roads. Temporary roads would be >1.5 miles from historical nest sites.
O-WL-16	Promote the conservation and recovery of bald eagle	EA Alts 1-3 CE – restoration CE - fuels	Based on analysis indicators and mitigations	Habitat will be maintained or improved with all alternatives and nesting eagles protected from disturbance which would help to promote recovery
S-WL-3	Management will be governed by Bald Eagle Recovery Plan	EA Alts 1-3 CE – restoration CE - fuels	Based on analysis indicators and mitigations	Habitat would be maintained or improved with all alternatives and nesting eagles protected from disturbance as outlined in NSBERP

D. Determination of Effects – Bald Eagle

EA Alternative/CE	Determination	Summary of Rationale
Alternative 1 – No Action	Not Likely to Adversely Affect	<p>Alternative 1 is the no-action Alternative which results in no proposed treatments or changes in the transportation system. There would be no planned disturbance within close proximity to the two known nests near Fourmile Lake. There would be no habitat improvements such as the pine interplanting proposed in Alternative 2 and 3. Underplanting white pine near Fourmile Lake is still being planned under a different decision document and this would provide future nest sites for eagles (see Restoration CE determination).</p> <p>As with the other alternatives, young pine would continue to naturally regenerate in some areas but brush competition would prevent regeneration in some stands. No temporary roads would result from this Alternative so I expect no effects as a result of human disturbance.</p>
Alternative 2	Not Likely to Adversely Affect	<p>I expect no direct effects to bald eagle as a result of implementing Alternative 2. Indirect effects on habitat as a result of harvesting would be insignificant or discountable. Red pine thinning is proposed for 48 acres but in stands that are more than two miles from Fourmile Lake. Two of these pine stands are within ½ mile of the Temperance River – a potential foraging location. It is unlikely that suitable perching trees would be removed since thinning targets the subdominant trees in the stand. 30 acres of pine interplanting is proposed in the project area which may create future habitat. Cumulative effects could occur but would be minimal. Eagle populations are rising and cumulative impacts are not expected to reverse this trend.</p>

EA Alternative/CE	Determination	Summary of Rationale
Alternative 3	Not Likely to Adversely Affect	I expect no direct effects to bald eagle as a result of implementing Alternative 3. Indirect effects on habitat as a result of harvesting would be insignificant or discountable. Red pine thinning is proposed for 48 acres but in stands that are more than two miles from Fourmile Lake. Two of these pine stands are within ½ mile of the Temperance River – a potential foraging location. It is unlikely that suitable perching trees would be removed since thinning targets the subdominant trees in the stand. 30 acres of pine interplanting is proposed in the project area which may create future habitat. Cumulative effects on habitat could occur but would be minimal (USDA 2007). Eagle populations are rising and cumulative impacts are not expected to reverse this trend.
Restoration CE	Not Likely to Adversely Affect	I expect no direct effects from the site prep (508 acres) and underplanting (123 acres) activities proposed in this CE. Underplanting near Fourmile Lake will follow the Bald Eagle Recovery Plan as restated in our operational standards (USDA 2007, Appendix C). Indirect effects on habitat may occur if young pine are removed or damaged during site prep activities; however, beneficial effects are expected as a result of white pine underplanting. There may be additional habitat benefits as a result of white pine planting in a stand near the Temperance River (comp. 153 stand 1). See cumulative effects discussion under EA alternatives which includes all Mid-Temperance management proposals.
Fuel Reduction CE	Not Likely to Adversely Affect	I expect no direct effects from the understory mechanical fuels reduction (201 acres) or underburning (85 acres) activities proposed in this CE. None of these activities are within ½ mile of a historical nest site or an area with nesting potential. Insignificant and discountable effects are expected to pine trees as a result of these activities. Fuel reduction activities would target the removal of young balsam and pine would be retained wherever possible. Underburning may result in the loss of some of the existing trees but would also create suitable sites for regenerating pine. See cumulative effects discussion under EA alternatives which includes all Mid-Temperance management proposals.

CANADA LYNX:

A. Analysis Area:

- **Direct/Indirect Effects Analysis Area:** *Habitat indicators:* The analysis area is federal lands within LAU 32

Human Disturbance indicators: The analysis area is federal roads within SNF 32.

- **Cumulative Effects Analysis Area:** Cumulative effects consider all ownerships and roads within LAU SNF 32. Past actions are taken into account in the existing condition. Present and foreseeable future (10 yrs) actions are considered. See Appendix E of the EA for a description of project activities considered in the Cumulative Effects analysis for this species (USDA 2007). Activities outside of the project area but within LAU 32 were considered in addition to those in Appendix E.

- **Analysis timeframe:**
 - *Existing condition:* 2007
 - *Direct/indirect and Cumulative effects:* 2016

Rationale for analysis are and timeframe: See Superior National Forest Plan Appendix E: Canada Lynx Section 5. Scales of Analysis, pg E-3 for rational for spatial analysis boundary. A reasonably foreseeable future timeframe of ten years is appropriate because it includes all known future projects and provides a reasonably reliable estimate of what is expected to happen. The year 2014 marks the first decade of the Forest Plan and is used as our benchmark to measure cumulative changes to management indicator habitats.

Table 1 provides a list of all Lynx analysis units (LAUs) that overlap the Mid-Temperance project area. Those that are not in bold will not be analyzed in this BA because this project will not affect lynx habitat within these LAUs or the effects are extremely small.

Acres and Percent of each Lynx Analysis Units (LAU) within the Mid-Temperance Project Area

LAU	Gross Acres	Acres of LAU in Project Area ¹	% of LAU in Project area
32	41675	40286	97
31	16904	724	4
29	32279	658	2
34	17940	256	1
36	34720	278	1
27	31011	68	<1

¹ Data source: project boundary cover (mtml_bnd_2.shp 7/30/2005) and lau cover (lau_new.shp 2/22/2005)

Almost all of the Mid-Temperance vegetation proposals and all of the road proposals are within LAU 32. There is one mechanical fuel reduction unit (8 ac), one harvest unit (46 ac) and a few acres proposed for white pine planting within LAU 31. I expect insignificant and discountable effects on lynx habitat with any of these activities.

Cumulative management actions are not expected to result in negative effects to lynx in LAU 31 since more than 90% of all lands will continue to be suitable in the future under a worst case scenario on nonfederal lands (project record). There are no temporary roads proposed in LAU31.

B. Effects Analysis – Canada Lynx:

- **Identify and analyze the direct and indirect effects of the action and the cumulative effects of other actions in the project area.**

Forest Plan BA Indicator	Use?	Rationale for exclusion
1a. Snowshoe hare habitat acres	N	The change in hare habitat is expected to be less than 5%. Existing condition= 49% of lynx habitat is hare foraging.
1b. Percent of unsuitable habitat on NFS land	N	Measured with Indicator 12
2. Acres of red squirrel habitat	N	The change in squirrel habitat is expected to be less than 3%. Existing condition = 46% of lynx habitat is squirrel foraging.
3. Denning habitat in patches > 5 acres	N	The change in denning habitat is expected to be less than 5%. Existing condition = 41% of forested lynx habitat is denning.
4. Percent of lynx habitat in LAUs with adequate canopy cover-upland forest > 4 years old and lowland forest > 9 years old	N	Measured with Indicator 11. The change in all lynx habitat is expected to be less than 5%. MT Lynx Habitat Map displays distribution of habitat.
5. Miles of ATV trails allowed	N	There are no designated ATV trails in the project area. This project does not propose any addition to the ATV trail system.
6. Miles of snowmobile trails allowed	N	This project proposes no change in the snowmobile trail system.
7. Miles of temp and OML 1&2 roads	Y	
8. Policy on cross-country use of ATVs and snowmobiles	N	This project proposes no change to the cross-country use of ATVs or snowmobile policy.
9. Policy on use of ATVs and snowmobiles on OML 1&2 roads	N	This project proposes no change to the policy on ATVs and snowmobile use of OML 1 and 2 roads.
Other Indicators		Rationale for inclusion
10. Acres where planting of young conifer is expected to increase within stand structure (project area).	Y	To compare beneficial site-specific features of each alternative of increasing small diameter conifers and stand structure as a component of prey habitat. To help assess O-WL-5

Forest Plan BA Indicator	Use?	Rationale for exclusion
11. Acres and % of lynx habitat currently unsuitable on all ownerships	Y	Provides information to examine G-WL-3
12. Cumulative change to unsuitable condition on NFS lands. (S-WL-1)	Y	Provides information to examine S-WL-1
13. Miles of roads to be decommissioned and new OML 1 roads to be closed on NFS lands	N	Road decommissioning/closing will be addressed in the East Zone Off-Highway Vehicle EA.
14. Miles of road where RMVs (off highway recreation motor vehicles) are allowed on NFS lands (OML 1&2, unclassified).	N	There will be no change in the roads open to RMVs by alternative. Off-highway vehicle use will be addressed in the East Zone Off-Highway Vehicle EA.
15. Road and compacted trail density on all ownership.	N	Road and trail density will not vary by alternative under the Mid-Temperance EA. Existing density = 1.23 miles/mi ²

Existing Conditions and Effects

Lynx Habitat – Forest Condition Indicators

Indicator 10. Project Area acres where planting of young conifer is proposed and will increase within stand structure. ¹				
Alternative 1 –No Action	Alternative 2	Alternative 3	Restoration CE ²	Fuels CE ³
0	204	204	631	0
¹ Represents stand acres. Treatment acres will be less and dependent on local site conditions ² Includes planting of white pine and white spruce following mechanical site prep and white pine underplanting. ³ Conifer is expected to naturally regenerate after mechanical fuels reduction and underburning. <i>Other Footnotes:</i> Alternatives 2 and 3 include acres of planting following single tree and group selection harvesting				

Lynx Habitat – Cumulative Vegetative Effects Indicators

Lynx Analysis Units	Total Lynx Habitat on all ownerships (acres)	Currently Unsuitable on all ownerships	
		acres	%
Indicator 11: Currently Unsuitable Lynx Habitat on all ownerships			
SNF 32	41,410	3,921	9
<i>Data Source:</i> ¹ Acreages based on April 2005 frozen CDS data <i>Other Footnotes:</i> This analysis assumes that all other ownership in SNF 32 is lynx habitat in an unsuitable condition (3,222 acres). Unsuitable federal acres = 699.			

Lynx Habitat – Cumulative Vegetative Effects Indicators (cont.)

Lynx Analysis Units	Existing Condition 2005 ¹		Alternative 1 (no action)			Alternative 2			Alternative 3		
			Present actions	Total change to unsuitable ³		Proposed change ⁴	Total changed to unsuitable		Proposed change ⁴	Total change to unsuitable	
	Ac	%	Ac ²	Ac	%	Ac	Ac	%	Ac	Ac	%
Indicator 12: Cumulative change to unsuitable habitat condition in 10 years on NFS lands											
SNF 32	225	<1	699	1138	3	725	2007	5	1074	2356	6
<i>Data source:</i> ¹ Existing Condition based on April 2005 Frozen CDS data. ² Reflects past actions since FP Implementation began that have resulted in a change to unsuitable. <i>Other Footnotes:</i> ³ Percent of lynx habitat on NFS lands (SNF 32 = 38,188ac) <i>Other Footnotes:</i> Includes proposed actions for the MidTemperance EA, CE and federal cumulative actions (see Appendix E of Mid-Temperance EA).											

Lynx Habitat – Human disturbance/Access Indicators

		Existing Condition ¹	Miles of road in 2014 ²		
			Alternative 1 (no action)	Alternative 2	Alternative 3
Indicators		miles	miles	miles	miles
Indicator 7. Miles of Temporary, Unclassified Road, OML 1, and OML 2 roads (Combined)					
Lynx Analysis Units	SNF 32	0, 1.44, 14.32, 26.40, (42.16)	0, 1.44, 14.32, 26.40, (42.16)	3.2, 1.44, 14.32, 26.4, (45.32)	4.3, 1.44, 14.3, 26.4, (46.49)
<i>Data Source:</i> ¹ Existing Condition and alternatives based on 1-30-2007 infraroads database for unclassified and system roads in LAU 32. Temporary road miles from project roads shapefiles MTEA Road Alt2 040207 and MTEA Road Alt3 040207. ² There are no road proposals in the fuels or restoration CE.					

CUMULATIVE EFFECTS

The Mid-Temperance EA alternatives were considered along with past, present and expected future management actions to address the cumulative effects on lynx. Appendix E of the Mid-Temperance EA summarizes the list of activities considered for all ownerships (USDA 2007). Indicator 11 measures the amount of unsuitable habitat across all ownerships. Because the Mid-Temperance alternatives do not propose any change in system roads, OHV trails or winter trails, there are no cumulative effects from these activities.

Adverse cumulative effects are not expected from vegetation management activities in LAU 32. Even under a scenario of maximum timber harvest for nonfederal lands, more than 90% of lynx habitat remains suitable across all ownerships (Indicator 12). In reality, we expect many of the State forest acres to continue to provide habitat and that minimal timber harvesting will take place on private lands (Appendix E, USDA 2007). Federal lands make up a large percentage of the LAU and mature forest types are expected to

increase over time (Chap3 pg. 3-23, USDA 2007). The amount of habitat on federal lands should offset any short-term loss in habitat on nonfederal lands. Timber harvesting could benefit lynx by creating habitat for prey species. Denning and foraging habitat would continue to be adequately distributed throughout the LAU (See MT Lynx Habitat Map).

As stated in the Programmatic BA, the greatest potential for cumulative negative impacts and pressure on lynx recovery is likely to be the result of human access. There are no permanent changes in access proposed in the Mid-Temperance EA or CEs. Temporary road miles are small (<5) and unlikely to have a measurable effect on lynx even when considered along with nonfederal temporary roads (Indicator 7).

The Forest's Tofte and Gunflint Districts are developing an East Zone Motorized Travel Project in coordination with Minnesota Department of Natural Resources, Lake and Cook Counties, 1854 Authority, and Grand Portage Band. This plan will address OHV use outside and within the project area. Currently there is a proposal to designate 6.04 miles of road as open to OHVs in the Mid-Temperance project area (5.64 mi. of OML4 roads and 0.4 mi. of unclassified road). Effects to lynx as a result of these changes in OHV use will be analyzed in a Biological Assessment for that plan.

Insignificant or discountable effects are expected for lynx from all other activities listed in Appendix E (USDA 2007). Using fire for restoration or fuel reduction may temporarily reduce foraging conditions but may increase prey habitat in five or more years. Fuel reduction activities may also lead to the removal of downed trees which may provide denning sites. The cumulative effect on denning habitat is expected to be minimal due to the low number of acres being treated and the availability of other denning habitat in the LAU. Restoration activities such as mechanical site prep will generally leave overstory trees standing and reduce the shrub density with insignificant and temporary changes to lynx habitat.

Private land development and road building will continue as will increased recreational demand in Mid-Temperance. These activities could reduce the lynx competitive advantage and increase the risk of mortality. Residential development around Pancore Lake may reduce habitat quality. The high percentage of federal lands in this LAU (95% of project area; 92% of LAU) will help offset the negative effects from development that lynx may encounter on nonfederal lands.

C. Consistency with Forest Plan – Canada lynx:

Forest Plan Guidance	Direction	Alts and CEs In Compliance	Basis for Compliance	Remarks
O-WL-4	Maintain or improve habitat	EA Alts 1-3 CE – restoration CE - fuels	All analysis indicators	Key vegetative habitat components are maintained in all alternatives. Stand structure and diversity would be improved with Alternatives 2 and 3 (see O-WL-5) and with the CE activities (Indicator 10).
O-WL-5	Seek opportunities to benefit TE spp.	EA Alts 2-3 CE – restoration CE - fuels	Indicator 10	Both action alternatives in the EA propose 204 acres of conifer planting within mature forest in stands such as 127.20 which could lead to local increases in prey diversity or abundance. Planting following site prep will add more young conifer to 600+ stand acres (Indicator 10).
O-WL-6	Reduce or eliminate adverse effects to TE	EA Alts 1-3 CE – restoration CE - fuels	Project design and mitigation measures.	The management proposals provide for key habitat components. Standards, guidelines and recommendation listed Appendix C protect denning lynx.
O-WL-7	Minimize building or upgrading roads in TE areas	EA Alts 1-3 CE – restoration CE - fuels	Project design and Indicator 7	No new system roads or upgrading of roads are proposed for this project. All temporary roads needed to access harvest units will be obliterated and allowed to return to a more natural state once reforestation objectives have been met.
O-WL-8	Promote the conservation and recovery of Canada lynx	EA Alts 1-3 CE – restoration CE - fuels	All analysis indicators	Habitat for species is maintained in all EA alternatives and in the CEs.
O-WL-9	Manage for hare and alt prey habitat	EA Alts 1-3 CE – restoration CE - fuels	Expected change in percent of habitat under existing and future condition.	I expect less than a 5% change in foraging habitat post-treatment. Mature forest types in the project area will continue to increase (see (Chap3 pg. 3-23, USDA 2007).
O-WL-10	Provide foraging habitat in proximity to denning habitat	EA Alts 1-3 CE – restoration CE - fuels	Maps of foraging and denning habitat with proposed treatments.	Denning habitat in patches greater than 5 acres is within 3 miles of adequate foraging habitat. See G-WL-10 below.

Forest Plan Guidance	Direction	Alts and CEs In Compliance	Basis for Compliance	Remarks
O-WL-11	Maintain habitat connectivity to reduce road mortality	EA Alts 1-3 CE – restoration CE - fuels	Maps of foraging and denning habitat with proposed treatments.	This project was not designed to address the objective. However, vegetative connectivity for movement across the LAU is maintained with all alternatives (see O-WL-10).
O-WL-12	Participate in efforts to identify, map, and maintain linkage areas	n/a	n/a	This effort is being conducted on a regional scale
O-WL-13	Maintain competitive advantage of lynx in deep snow	EA Alts 1-3 CE – restoration CE - fuels	Indicator 7	No new system roads or upgrading of roads are proposed for this project. All temporary roads needed to access harvest units will be obliterated and allowed to return to a more natural state once reforestation objectives have been met.
O-WL-14	Participate in efforts to reduce lynx mortality on roads	n/a	n/a	This project is not specifically designed to reduce lynx mortality on roads.
O-WL-15	In BWCAW, lynx habitat will result from natural processes	n/a	n/a	This project does not occur in the BWCAW and will have no effect on lynx refugia habitat.
G-WL-1	Moderate timing and intensity of mgt activities to maintain lynx habitat	EA Alts 1-3 CE – restoration CE - fuels	Project design	All alternatives and proposed actions are within the ecological constraints relevant to lynx habitat
G-WL-2	Provide protection of known den sites	EA Alts 1-3 CE – restoration CE - fuels	Forest Plan	There are no known den sites in the project area or LAU 32.
G-WL-3	No more than 30% of an LAU in unsuitable condition across all ownerships.	EA Alts 1-3 CE – restoration CE - fuels	Indicator 11 and 12	The percent of unsuitable habitat in LAU 32 on all ownerships is expected to stay low (9% or less) in this decade under any alternative. It is likely that many more acres of nonfederal lands would remain suitable than displayed in Indicator 11. There are no foreseeable future federal projects in LAU32 that would increase the amount of unsuitable above what is displayed in Indicator 12.
S-WL-1	No more than 15% change to unsuitable in 10 years on NFS lands.	1-3	Indicator 12	I expect no more than a 6% change in lynx unsuitable habitat in the next ten years on National Forest Service Lands.

Forest Plan Guidance	Direction	Alts and CEs In Compliance	Basis for Compliance	Remarks
G-WL-4	Maintain at least 10% denning habitat	1-3	Expected change in percent of habitat under existing and future condition.	I expect less than a 5% change in denning habitat post-treatment. Mature forest types in the project area will continue to increase (see (Chap3 pg. 3-23, USDA 2007)).
G-WL-5	Following disturbance, retain at least 10% denning habitat.	n/a	n/a	This project is not proposing to salvage after a natural disturbance
S-WL-2	No net increase in groomed or designated over-the-snow trails	n/a	n/a	This project does not propose to create any new snow-compacting trails.
G-WL-6	New over-the-snow routes should be designed to benefit lynx	n/a	n/a	This project does not propose to create any new snow-compacting trails.
G-WL-7	Close trails and roads that intersect with new snow-compacting trails.	n/a	n/a	This project does not propose to create any new snow-compacting trails.
G-WL-8	Maintain road density at or below 2mi/mi ²	1-3	Indicator 7	Existing road/trail density is 1.23 miles/mi ² . This density will not change under any alternative.
G-WL-9	Do not upgrade or pave dirt or gravel roads	n/a	n/a	This project does not propose to upgrade or pave dirt roads

D. Determination of Effects - Canada Lynx

Alternative	Determination	Summary of Rationale
Alternative 1 – No Action	Not Likely to Adversely Affect	<p>Forest conditions would continue to provide for lynx denning, foraging and movement across the analysis area (Indicators 11 and 12, see MT Lynx Habitat Map). Less than 9% of existing lynx habitat on all ownerships is unsuitable and only 3% becomes unsuitable in the next decade on federal lands (Indicator 11 and 12). The proximity of denning and foraging habitat would be maintained (see MT Lynx Habitat Map). There would be no added habitat benefits resulting from conifer planting within mature forest stands to increase within stand structure and diversity (Indicator 10); however, the structure and diversity of the vegetation will improve in some areas through natural succession. The road and compacted trail density for LAU 32 is 1.23 miles/mi² which would not change with any alternative. There would be no temporary roads built under the No Action Alternative. The effects of nonfederal activities are expected to be minimal because the majority of LAU 32 is in federal ownership.</p>

Alternative	Determination	Summary of Rationale
Alternative 2	Not Likely to Adversely Affect	<p>Effects are expected to be insignificant or discountable for the following reasons: Forest conditions would continue to provide for lynx denning, foraging and movement across the analysis area. Less than 9% of existing lynx habitat on all ownerships is unsuitable (Indicator 11). I expect a 5% change in lynx habitat on federal lands when considered with other past, present and future actions (Indicator 12). The proximity of denning and foraging habitat would be maintained (see MT Lynx Habitat Map). Habitat benefits of this alternative include 204 acres of conifer planting within mature forest stands to increase within stand structure and diversity (Indicator 10). The road and compacted trail density for LAU 32 is 1.23 miles/mi² and will not change with this alternative. Temporary roads can potentially decrease the competitive advantage of lynx until they are decommissioned. This alternative has 3.2 miles of temporary roads proposed (Indicator 7) which is unlikely to have an effect on lynx. All temporary roads needed to access harvest units will be obliterated and allowed to return to a more natural state once reforestation objectives have been met. In the unlikely event that a lynx den is discovered, it would be protected from disturbance. Cumulative effects could contribute but are expected to be minimal because the majority of LAU 32 is in federal ownership.</p>

Alternative	Determination	Summary of Rationale
<p style="text-align: center;">Alternative 3</p>	<p style="text-align: center;">Not Likely to Adversely Affect</p>	<p>Effects are expected to be insignificant or discountable for the following reasons: Forest conditions would continue to provide for lynx denning, foraging and movement across the analysis area. Less than 9% of existing lynx habitat on all ownerships is unsuitable (Indicator 11). I expect a 6% change in lynx habitat on federal lands when considered with other past, present and future actions (Indicator 12). The proximity of denning and foraging habitat would be maintained (see MT Lynx Habitat Map). Habitat benefits of this alternative include 204 acres of conifer planting within mature forest stands to increase within stand structure and diversity (Indicator 10). The road and compacted trail density for LAU 32 is 1.23 miles/mi² and will not change with this alternative. Temporary roads can potentially decrease the competitive advantage of lynx until they are decommissioned. This alternative has 4.3 miles of temporary roads proposed (Indicator 7) which is unlikely to have an effect on lynx. All temporary roads needed to access harvest units will be obliterated and allowed to return to a more natural state once reforestation objectives have been met. In the unlikely event that a lynx den is discovered, it would be protected from disturbance. Cumulative effects could contribute but are expected to be minimal because the majority of LAU 32 is in federal ownership.</p>

Alternative	Determination	Summary of Rationale
<p style="text-align: center;">Restoration CE</p>	<p style="text-align: center;">Not Likely to Adversely Affect</p>	<p>I expect insignificant or discountable effects from the site prep (508 acres) and underplanting (123 acres) activities proposed in this CE (Indicator 10). . Planting of white pine and white spruce following mechanical site prep will add young conifers to brushy open stands and add structural diversity to the vegetation. This along with underplanting white pine in mature forest stands will improve habitat conditions for hare and lynx. The proximity of denning and foraging habitat would be maintained (see MT Lynx Habitat Map). The road and compacted trail density for LAU 32 is 1.23 miles/mi² and will not change with this alternative. See cumulative effects discussion under EA alternatives which includes all Mid-Temperance management proposals.</p>
<p style="text-align: center;">Fuel Reduction CE</p>	<p style="text-align: center;">Not Likely to Adversely Affect</p>	<p>I expect insignificant or discountable effects from the understory mechanical fuels reduction (201 acres) or underburning (85 acres) activities proposed in this CE. The temporary reduction in understory trees and coarse woody debris may reduce cover for lynx but underburning activities may also encourage new plant growth and improve habitat for hare and lynx. Most of the treatments being proposed are within red pine plantations and treatment acres are small relative to habitat availability on the landscape. The proximity of denning and foraging habitat would be maintained (see MT Lynx Habitat Map). The road and compacted trail density for LAU 32 is 1.23 miles/mi² and will not change with this alternative. See cumulative effects discussion under EA alternatives which includes all Mid-Temperance management proposals.</p>

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